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(54) VIDEO SIGNAL TRANSMISSION METHOD AND SYSTEM THEREFOR, VIDEO OUTPUT DEVICE, ADDITIONAL INFORMATION DETECTION DEVICE, RECORDING DEVICE AND RECORDING MEDIUM

(57)Abstract:
PROBLEM TO BE SOLVED: To invert the luminance change of additional information overlapped with a video signal, averaging it with adjacent additional information different in polarities, to improve the detection precision of additional information and to prevent the visual obstacle of a reproduced video from becoming conspicuous by inverting the polarities of additional information in a prescribed unit section and the adjacent unit section.
SOLUTION: A PN code inversion part 16 inverts the polarity of the PN code S5 of a PN code generation part 15 at an inverted timing signal HT inverting at every vertical section, forms a PN inverted code S6 and supplies it to an SS copy prevention control signal generation part 17. A copy prevention control signal S3 as additional information is spectrum-spreaded by using the PN inverted code S6. The spread spectrum signal S7 of the copy prevention control signal S3 is formed. Then, it is supplied to an addition part 18 as an analog signal S7A through a D/A conversion circuit 192, it is overlapped with an analog video signal S2A and it is outputted to a recording device recording it into a recording medium as an output video signal S8A.

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CLAIMS

[Claim(s)]
[Claim 1] It is the video-signal transmission approach of superimposing and transmitting additional information to a video signal, and detecting said additional information from said this transmitted video signal. Said additional information While generating synchronizing with the synchronizing signal of said video signal for every N times (N>=1) or 1/N time as many unit section of the 1 field of said video signal as this Although phase inversion of the thing of the predetermined unit section of the additional information for said every unit section is carried out and being detected for said every unit section on the basis of the synchronizing signal of said video signal in detection of said additional information from said video signal Said predetermined unit section by which phase inversion is carried out is the video-signal transmission approach characterized by detecting by carrying out phase inversion of the video signal with which it is superimposed on said additional information on parenchyma, and detecting said additional information.
[Claim 2] Said additional information is a spectrum diffusion signal with the diffusion sign generated synchronizing with the synchronizing signal of said video signal. Carry out phase inversion of the thing of said predetermined unit section of this spectrum diffusion signal, and it is made to superimpose on said video signal. And detection of said additional information It is what is performed by carrying out the back diffusion of electrons of the video signal with which the diffusion sign of the back diffusion of electrons was overlapped on said additional information synchronizing with the

synchronizing signal of said video signal. The video-signal transmission approach according to claim 1 characterized by carrying out phase inversion of the diffusion sign for these back diffusion of electrons in the section corresponding to said unit section which is carrying out phase inversion.

[Claim 3] It is the video-signal transmission approach of superimposing and transmitting additional information to a video signal, and detecting said additional information from said this transmitted video signal. Said additional information While generating synchronizing with the synchronizing signal of said video signal for every N times (N>=1) or 1/N time as many unit section of the 1 field of said video signal as this Make it not superimpose said additional information on the predetermined unit section of said video signal for said every unit section, and in detection of said additional information from said video signal On the basis of the synchronizing signal of said video signal, said predetermined unit section when it is not superimposed on said additional information The video-signal transmission approach characterized by detecting by carrying out phase inversion of the video signal with which it is superimposed on said additional information, and integrating it over two or more unit section on parenchyma, and detecting said additional information.

[Claim 4] Said additional information is a spectrum diffusion signal with the diffusion sign generated synchronizing with the synchronizing signal of said video signal. It is that on which additional information is not superimposed by the thing of said predetermined unit section of said video signal. And detection of said additional information It is what is performed by carrying out the back diffusion of electrons of the video signal with which the diffusion sign of the back diffusion of electrons was overlapped on said additional information synchronizing with the synchronizing signal of said video signal. The video-signal transmission approach according to claim 3 characterized by carrying out phase inversion of the diffusion sign for these back diffusion of electrons in said predetermined unit section when it is not superimposed on said additional information.

[Claim 5] Supply of said video signal outputted from the video-signal output unit which outputs the video signal which superimposed additional information, and said video-signal output unit is received. It is the video-signal transmission system which consists of a video-signal processor equipped with the additional information detecting element which detects said additional information from said video signal. Said video-signal output unit 1st timing signal generating means to generate the timing signal which synchronizes with the synchronizing signal of said video signal, It synchronizes with the synchronizing signal of said video signal on the basis of said

timing signal. It is what generates said additional information for every N times (N>=1) or 1/N time as many unit section of the 1 field of said video signal as this. The additional information generating means is made to carry out phase inversion of the thing of the predetermined unit section of the additional information for said every unit section, and it makes generate, or it is made to generate without superimposing additional information, It has a superposition means to superimpose said additional information from said additional information generating means on said video signal on minute level. Said additional information detecting element 2nd timing signal generating means to generate the timing signal which synchronizes with the synchronizing signal of the video signal from said video-signal output unit, On the basis of the timing signal from said 2nd timing signal generating means, the predetermined unit section when said additional information is reversed, or the predetermined unit section when it is not superimposed on said additional information The video-signal transmission system characterized by having an additional information detection means to detect by carrying out phase inversion of the video signal from said video-signal output unit on parenchyma, and to detect said additional information.

[Claim 6] Said additional information is a spectrum diffusion signal with the diffusion sign generated synchronizing with the synchronizing signal of said video signal, and it sets to said video-signal output unit. The thing of said predetermined unit section of this spectrum diffusion signal is what is made to carry out phase inversion, is made to superimpose on said video signal, and is outputted. Or detection of said additional information [in / it outputs to said predetermined unit section without superimposing additional information on a video signal, and / said additional information detecting element] It is what is performed by carrying out the back diffusion of electrons of the video signal with which the diffusion sign of the back diffusion of electrons was overlapped on said additional information synchronizing with the synchronizing signal of said video signal. The video-signal transmission system according to claim 5 characterized by carrying out phase inversion of the diffusion sign for these back diffusion of electrons in the section corresponding to said predetermined unit section which is carrying out phase inversion, or the predetermined unit section when it is not superimposed on said additional information.

[Claim 7] Said predetermined unit section is claim 1 characterized by preparing by turns for every two or more unit section, claim 2, and the video-signal transmission approach according to claim 3 or 4.

[Claim 8] Said predetermined unit section is claim 1 characterized by what is defined

according to a random-number sequence, claim 2, and the video-signal transmission approach according to claim 3 or 4.

[Claim 9] Said predetermined unit section is a video-signal transmission system according to claim 5 or 6 characterized by preparing by turns for every two or more unit section.

[Claim 10] Said predetermined unit section is a video-signal transmission system according to claim 5 or 6 characterized by what is defined according to a random-number sequence.

[Claim 11] The additional information which is the approach of superimposing and outputting additional information to a video signal, and is superimposed on said video signal is a video-signal output method characterized by carrying out phase inversion for every plurality of said unit section -, and making it generate while synchronizing with the synchronizing signal of said video signal and generating for every N times (N>=1) or 1/N time as many unit section of the 1 field of said video signal as this.

[Claim 12] It is the video-signal output method according to claim 11 which said additional information is a spectrum diffusion signal with the diffusion sign generated synchronizing with the synchronizing signal of said video signal, and is characterized by carrying out phase inversion of this spectrum diffusion signal for every plurality of said unit section -.

[Claim 13] A timing signal generating means to generate the timing signal which synchronizes with the synchronizing signal of a video signal, It synchronizes with the synchronizing signal of said video signal on the basis of said timing signal. And it is what generates said additional information for every N times (N>=1) or 1/N time as many unit section of the 1 field of said video signal as this. The video-signal output unit characterized by having an additional information generating means to carry out phase inversion of said additional information by turns, and to make it generate it for every plurality of said unit section -, and a superposition means to superimpose said additional information from said additional information generating means on said video signal on minute level.

[Claim 14] Said additional information is a video-signal output unit according to claim 13 which is a spectrum diffusion signal with the diffusion sign generated synchronizing with the synchronizing signal of said video signal, and is characterized by carrying out phase inversion for every plurality of said unit section of this spectrum diffusion signal -.

[Claim 15] Additional information detection equipment characterized by having a timing signal generating means to generate the timing signal which synchronizes with

the synchronizing signal of an input video signal, and a detection means to detect the additional information on which said input video signal is overlapped according to the phase inversion for every N times or 1/N time as many unit section of the 1 field of said video signal as this on the basis of the timing signal from said timing signal generating means.

[Claim 16] Said additional information is a spectrum diffusion signal with the diffusion sign generated synchronizing with the synchronizing signal of said video signal. Said detection means It is what is performed by carrying out the back diffusion of electrons of the video signal with which the diffusion sign of the back diffusion of electrons was overlapped on said additional information synchronizing with the synchronizing signal of said video signal. Additional information detection equipment according to claim 15 characterized by carrying out phase inversion of the diffusion sign for these back diffusion of electrons in the section corresponding to said unit section which is carrying out phase inversion.

[Claim 17] Supply of said video signal outputted from the video-signal output unit which outputs a video signal, and said video-signal output unit is received. It is the video-signal transmission system equipped with the recording device which records said video signal on a record medium. Said video-signal output unit To the timing on the basis of the 1st diffusion sign generation means which generates a diffusion sign to the generating initiation timing on the basis of the synchronizing signal of a video signal, and the synchronizing signal of said video signal The 1st diffusion sign reversal means which reverses the phase of said diffusion sign from said 1st diffusion sign generation means, The spectrum diffusion-process means which carries out spectrum diffusion of the additional information superimposed on said video signal according to said diffusion sign processed by said 1st diffusion sign reversal means, It has a superposition means to superimpose said additional information by which spectrum diffusion was carried out with said spectrum diffusion-process means on said video signal. Said recording device To the generating initiation timing on the basis of the synchronizing signal of the video signal supplied from said video-signal output unit To the 2nd diffusion sign generation means which generates a diffusion sign, and the timing on the basis of the synchronizing signal of the video signal supplied from said video-signal output unit The diffusion sign reversal means by the side of the record which reverses the phase of said diffusion sign from said 2nd diffusion sign generation means, The reverse spectrum diffusion-process means which takes out said additional information on which said video signal which performs reverse spectrum diffusion and is supplied from said video-signal output unit according to said diffusion

sign processed by said 2nd diffusion sign reversal means was overlapped, The video-signal transmission system characterized by having the duplicate control means which performs duplicate control of said video signal based on said additional information taken out by said reverse spectrum diffusion-process means.

[Claim 18] Said video-signal output unit is a video-signal transmission system according to claim 17 which spectrum diffusion is carried out and is characterized by having the level adjustment device which adjusts the level of said additional information supplied to said superposition means in said spectrum diffusion-process means.

[Claim 19] The video-signal output unit according to claim 14 which spectrum diffusion is carried out and is characterized by having the level adjustment device which adjusts the level of said additional information supplied to said superposition means in said spectrum diffusion-process means.

[Claim 20] Are the recording device of the video signal with which it was superimposed on the additional information by which spectrum diffusion was carried out according to the diffusion sign which made it generate to the timing on the basis of the synchronizing signal in a video signal, and to the generating initiation timing on the basis of the synchronizing signal of said video signal To the timing on the basis of a diffusion sign generation means to generate a diffusion sign, and the synchronizing signal of said video signal A diffusion sign reversal means to reverse the phase of said diffusion sign from said diffusion sign generation means, The reverse spectrum diffusion-process means which takes out said additional information on which reverse spectrum diffusion was carried out and said video signal was overlapped according to said diffusion sign processed by said diffusion sign reversal means, The recording device characterized by having the duplicate control means which performs duplicate control of said video signal based on said additional information taken out by said reverse spectrum diffusion-process means.

[Claim 21] The record medium characterized by recording the video signal on which the additional information which carried out spectrum diffusion using said diffusion sign to which the reversal process which reverses the phase of the diffusion sign by which generating is started to the timing on the basis of the synchronizing signal of said video signal was performed, and said reversal process was performed to the generating initiation timing on the basis of the synchronizing signal of a video signal was made to superimpose.

[Claim 22] The video-signal transmission approach characterized by to generate the reversal diffusion sign which reversed the phase of said diffusion sign to the timing on

the basis of the image synchronizing signal in said video signal, and to carry out the spectrum diffusion of said additional information using said reversal diffusion sign while generating the diffusion sign which is the video-signal transmission approach of superimposing and transmitting the additional information which carried out spectrum diffusion to an analog video signal, and synchronized with the synchronizing signal in a video signal, and which repeats for every period.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention reproduces the video signal currently recorded on the record medium, and relates to the video-signal output unit used by the approach of superimposing and transmitting additional information, such as a duplicate prevention control signal used in order to restrict or forbid recording on another record medium, to a video signal, the system, and this system, additional information detection equipment, and a record medium.

[0002]

[Description of the Prior Art] VTR (video tape recorder) spreads and much reproducible software is increasingly offered with VTR. Moreover, recently, digital VTR, the regenerative apparatus of DVD (digital videodisc), etc. are actual, and it reproduces easily, and can view now and listen to the good image of image quality and

tone quality, and voice.

[0003] However, there is a problem that there is a possibility that the software with which is one side and abundance came to be provided in this way may be reproduced without any restriction, and some duplicate prevention approaches are used from the former.

[0004] For example, when VTR which outputs the video signal of an analog is used, there is the duplicate prevention approach of using a difference of the method of AGC (automatic gain control) of the monitor receiving set which displays VTR and the image as a recording device, or a difference of the property of APC (auto phase control).

[0005] VTR performs AGC with the false synchronizing signal inserted in the video signal, and as a synchronizing signal for AGC, in the case of the approach of using a difference of the method of AGC, a monitor receiving set inserts a false synchronizing signal with extremely big level, and it outputs it to it at the video signal supplied to VTR for record from VTR for playback as the AGC method by this false synchronizing signal is adopted.

[0006] Moreover, VTR performs APC with the phase of the color burst in a video signal itself, and in the case of the approach of using a difference of the property of APC, a monitor receiving set reverses partially the phase of the color burst signal of the video signal supplied to VTR for record from VTR for playback as a different APC method from this is adopted.

[0007] An image is reproduced normally, without influencing this in the monitor receiving set which receives supply of the video signal of the analog from VTR for playback of the partial phase reversal of the color burst signal used for a false synchronizing signal or APC.

[0008] And the false synchronizing signal was inserted as mentioned above from VTR for playback, or in response to supply of the video signal of the analog which received phase inversion control of a color burst signal, in VTR which records this on a record medium, gain control based on an input signal or phase control cannot be performed normally, but a video signal can be normally recorded no longer. Therefore, even if it reproduces the recorded video signal, it can avoid reproducing the normal image to which it can view and listen.

[0009] Moreover, the digitized video signal is treated, for example, in digital VTR, the duplicate prevention control signal which consists of a duplicate prevention sign or a generation limit sign of a duplicate is added to a video signal as digital data, and record Lycium chinense is made to perform duplicate prevention control of forbidding a

duplicate to a record medium.

[0010] In this case, the digital VTR as a regenerative apparatus reads the video signal recorded on the record medium, a sound signal, and a duplicate prevention control signal, and supplies them to the digital VTR as a recording apparatus as a regenerative signal of digital one or an analog.

[0011] In the digital VTR as a recording apparatus, a duplicate prevention control signal is extracted from the supplied regenerative signal, and record control to the record medium of the regenerative signal supplied based on this duplicate prevention control signal is performed. For example, when a duplicate prevention control signal is a thing containing a duplicate prevention sign, the digital VTR as a recording apparatus is controlled not to perform record processing.

[0012] Moreover, when a duplicate prevention control signal is a thing containing the generation limit sign of a duplicate, record control is performed according to this generation limit sign. For example, when a generation limit sign is the information to which the duplicate only for one generation is permitted, the digital VTR as a recording apparatus adds a duplicate prevention sign, and records the video signal of digital data, and a sound signal on a record medium. Therefore, if the reproduced record medium is used, it prevents from reproducing a video signal.

[0013] Thus, in the so-called digital connection supplied to the digital VTR as a recording apparatus by making a video signal, a sound signal, and a duplicate prevention control signal into a digital signal, in a recording apparatus side, duplicate prevention control using a duplicate prevention control signal can be performed by supplying the duplicate prevention control signal as digital data to the digital VTR as a recording apparatus.

[0014] However, in the analog connection which supplies a video signal and a sound signal as an analog signal, a duplicate prevention control signal will be missing in the process which carries out D/A conversion of the signal supplied to a recording device. For this reason, in analog connection, a duplicate prevention control signal will have to be added to the video signal and sound signal by which D/A conversion was carried out, and a video signal and a sound signal will be degraded.

[0015] That is, it is difficult to add a duplicate prevention control signal, to take out in a recording device, without degrading the video signal and sound signal by which D/A conversion was carried out, and to use for duplicate prevention control.

[0016] Then, it is made to perform duplicate prevention conventionally using the duplicate prevention approach of using a difference of the method of AGC of VTR mentioned above and a monitor receiving set, or a difference of the property of APC

in analog connection.

[0017]

[Problem(s) to be Solved by the Invention] By the way, in the case of the duplicate prevention approach of using a difference of the method of AGC of VTR mentioned above and a monitor receiving set, or a difference of the property of APC, depending on the method of AGC by the side of a recording device, and the property of APC, record of a video signal will be performed normally, the case where duplicate prevention cannot be performed occurs or there is a possibility that problems, like the playback image of a monitor receiving set is confused may arise. Moreover, it is troublesome to change the duplicate prevention approach by analog connection and digital connection as mentioned above.

[0018] Then, the applicant has proposed the method (Japanese Patent Application No. 7-339959) which superimposes additional information, such as a duplicate prevention control signal which carried out spectrum diffusion, on a video signal as an effective duplicate prevention method in any [of analog connection and digital connection] case, without degrading previously the image and voice which are reproduced.

[0019] According to this method, in original record-medium creation time, the sign (henceforth a PN code) of PN (Pseudorandom Noise) sequence used as a diffusion sign is generated a period early enough, spectrum diffusion is carried out by multiplying this to additional information bits, such as a duplicate prevention control signal, and the additional information of a narrow-band and a high level is transformed to the signal of the broadband and low which affect neither a video signal nor a sound signal. And this additional information by which spectrum diffusion was carried out is superimposed and recorded on the video signal supplied to a record medium.

[0020] The PN code used for the spectrum diffusion by the side of a regenerative apparatus on the other hand to the video signal supplied to the recording device side from the regenerative apparatus and the PN code with same generating timing and phase are generated, and reverse spectrum diffusion which takes out a duplicate prevention control signal in the original additional information and this case is performed by multiplying by the video signal with which this PN code was superimposed on the additional information by which spectrum diffusion was carried out. And duplicate prevention is controlled based on the duplicate prevention control signal taken out by reverse spectrum diffusion.

[0021] Thus, since spectrum diffusion is carried out at a regenerative-apparatus side and additional information, such as a duplicate prevention control signal, is superimposed by the video signal as a signal of a broadband and a low, it is difficult for

those who are going to reproduce illegally removing the duplicate prevention control signal on which it was superimposed from a video signal.

[0022] However, it is possible to detect and use the duplicate prevention control signal on which it was superimposed when those who are going to prevent an illegal duplicate did reverse spectrum diffusion. Therefore, a recording device side can be certainly provided with a duplicate prevention control signal with a video signal, and duplicate control according to the duplicate prevention control signal which detected and detected the duplicate prevention control signal to the recording device side can be ensured.

[0023] As mentioned above, in order for the additional information by which spectrum diffusion was carried out to be superimposed by the video signal as a signal of a broadband and a low according to this method, but to make it not degrade a video signal, it is necessary to superimpose on smaller level than the S/N ratio of a video signal.

[0024] In order to make detectable additional information on which the additional information by which spectrum diffusion was carried out was superimposed on the video signal, and was superimposed by the video signal in the recording apparatus on smaller level than the S/N ratio of a video signal, it is necessary to enlarge the number of PN codes required in order to carry out spectrum diffusion of the 1 bit of additional information (PN code length) enough. The PN code length per bit of this additional information can put it in another way as the diffusion gain (diffusion coefficient) which is the ratio (T/TC) of the time amount width of face T per bit of additional information, and the time amount width of face TC for one PN code (one chip). This diffusion gain is the S/N ratio of the information signal which superimposes additional information, and ****** for which it asks according to the S/N ratio of a video signal in this case as follows.

[0025] For example, it must be made to have to superimpose the additional information on which spectrum diffusion of the S/N ratio of the video signal on which additional information is made to superimpose is carried out in the case of 50dB, and a video signal is overlapped on 50dB or more on the small level which is the S/N ratio of a video signal. Moreover, in order to detect the additional information on which the video signal was overlapped, only the S/N ratio which can fully restore to the additional information after spectrum diffusion must be secured to coincidence. When this S/N ratio is set to 10dB, as diffusion gain, 60dB (50dB for a S/N ratio of a video signal) (+ (10dB for a S/N ratio required for detection)) is needed. In this case, the PN code length per bit of additional information turns into 1 million code length.

[0026] There are an approach and a slide correlation technique using a matched filter as an approach of detecting the PN code on which the video signal is overlapped at the recording device side. In the case of the former approach, it is possible to detect a PN code at a high speed, but code length is restricted to the short thing. The code length realized is about 256 and code length per bit of additional information cannot detect the PN code of 1 million. Moreover, in the case of the latter approach, long code length's PN code is detectable, but detection takes time amount. Therefore, in order for code length to detect the PN code of 1 million, it is expected that considerable time amount may be needed.

[0027] Moreover, when the superposition level of the additional information by which spectrum diffusion was carried out becomes as large as possible, the additional information on which it was superimposed serves as visual active jamming, and becomes easy to be conspicuous.

[0028] In view of the above thing, this invention sweeps away the above-mentioned trouble, and while superimposing additional information so that a video signal may not be degraded, it aims at taking out the superimposed additional information correctly and quickly, and enabling it to use it.

[0029]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the video-signal transmission approach according to claim 1 by this invention It is the video-signal transmission approach of superimposing and transmitting additional information to a video signal, and detecting said additional information from said this transmitted video signal. Said additional information While generating synchronizing with the synchronizing signal of said video signal for every N times (N>=1) or 1/N time as many unit section of the 1 field of said video signal as this Phase inversion of the thing of the predetermined unit section of the additional information for said every unit section is carried out, and on the basis of the synchronizing signal of said video signal, said additional information is detected according to said phase inversion for said every unit section, and it is characterized by deciding said additional information.

[0030] In invention of this claim 1, the section reversed as a unit is established in additional information in the N times or 1/N time as many unit section of the 1 field of a video signal as this. There is the storage effect in the playback image, and a horizontal direction and a perpendicular direction, and the same component by which phase inversion is carried out stop being conspicuous on vision in the directions of space between the fields etc. further in a video signal.

[0031] That is, the phase (polarity) has reversed additional information in a certain unit section and the unit section which adjoins it. For this reason, like the polarity reversals for every field of the chrominance subcarrier of a color video signal, and the polarity reversals for every horizontal scanning period, since brightness change is reversed by the adjoining additional information from which a polarity differs, the additional information on which the video signal was overlapped is equalized, and it is made not conspicuous [additional information]. That is, even if superimposed on additional information, it can avoid being conspicuous in visual active jamming of the image reproduced.

[0032] And detection of additional information is performed in the predetermined unit section when it is a superposition side at and phase inversion of the additional information is carried out by carrying out phase inversion of the video signal with which it is superimposed on the additional information concerned. When additional information is detected over two or more unit section at this time, since phase inversion of the video signal will be carried out and additional information will be detected, while level doubles, a video-signal component is offset by the correlation during the unit section, and, as for additional information, it is removed in the unit section when it is reversed at and is superimposed on a certain unit section and additional information. For this reason, detection of additional information becomes easy.

[0033] Invention of claim 2 is set to invention of claim 1. Moreover, said additional information It is a spectrum diffusion signal with the diffusion sign generated synchronizing with the synchronizing signal of said video signal. Carry out phase inversion of the thing of said predetermined unit section of this spectrum diffusion signal, and it is made to superimpose on said video signal. And detection of said additional information It carries out by carrying out the back diffusion of electrons of the video signal with which the diffusion sign of the back diffusion of electrons was overlapped on said additional information synchronizing with the synchronizing signal of said video signal, and is characterized by carrying out phase inversion of the diffusion sign for these back diffusion of electrons in the section corresponding to said unit section which is carrying out phase inversion.

[0034] In invention of this claim 2, while generation of a diffusion sign is started to the generating initiation timing based on the synchronizing signal of a video signal, phase inversion of the spectrum diffusion signal is carried out for every timing based on the synchronizing signal of a video signal. Thus, by carrying out phase inversion of the spectrum diffusion signal in the predetermined unit section, it becomes the

superposition mode which is not conspicuous on a playback image like the above-mentioned.

[0035] Moreover, the generating timing of a diffusion sign is decided based on the synchronizing signal of a video signal. For this reason, it can perform easily making generating timing of the diffusion sign which makes it generate in an additional information detection side the same as the generating timing of the diffusion sign used for the additional information superposition side based on the synchronizing signal of a video signal.

[0036] And although detection of additional information is performed by reverse spectrum diffusion, the diffusion sign for reverse spectrum diffusion is reversed corresponding to the reversed unit section, and additional information is detected. In this case, when a back-diffusion-of-electrons result is integrated and detected over two or more unit section, for example by the back diffusion of electrons within the unit section in when the ability not to perform detection of additional information etc., since the video-signal component of each other is offset by the functionality of the thing of that unit section unit, detection of additional information becomes easy.

[0037] It is the video-signal transmission approach of invention of claim 3 superimposing and transmitting additional information to a video signal, and detecting said additional information from said this transmitted video signal. Moreover, said additional information While generating synchronizing with the synchronizing signal of said video signal for every N times (N>=1) or 1/N time as many unit section of the 1 field of said video signal as this Make it not superimpose said additional information on the predetermined unit section of said video signal for said every unit section, and in detection of said additional information from said video signal On the basis of the synchronizing signal of said video signal, said predetermined unit section when it is not superimposed on said additional information carries out phase inversion of the video signal with which it is superimposed on said additional information on parenchyma, and is characterized by detecting over two or more unit section, and detecting said additional information.

[0038] In invention of this claim 3, detection of additional information is performed in the predetermined unit section when it is a superposition side at and a video signal is not overlapped on additional information by carrying out phase inversion of the video signal with which it is superimposed on the transmitted additional information. When additional information is detected over two or more unit section at this time, since phase inversion of the video signal will be carried out and additional information will be detected, a video-signal component is offset by the correlation during the unit section,

and is removed in the unit section when it is not superimposed on a certain unit section and additional information. Therefore, detection of additional information becomes easy.

[0039] Moreover, the video-signal transmission system of invention of this claim 17 Supply of said video signal outputted from the video-signal output unit which outputs a video signal, and said video-signal output unit is received. It is the video-signal transmission system equipped with the recording device which records said video signal on a record medium. Said video-signal output unit To the timing on the basis of the 1st diffusion sign generation means which generates a diffusion sign to the generating initiation timing on the basis of the synchronizing signal of a video signal, and the synchronizing signal of said video signal The 1st diffusion sign reversal means which reverses the phase of said diffusion sign from said 1st diffusion sign generation means, The spectrum diffusion-process means which carries out spectrum diffusion of the additional information superimposed on said video signal according to said diffusion sign processed by said 1st diffusion sign reversal means, It has a superposition means to superimpose said additional information by which spectrum diffusion was carried out with said spectrum diffusion-process means on said video signal. Said recording device To the generating initiation timing on the basis of the synchronizing signal of the video signal supplied from said video-signal output unit To the 2nd diffusion sign generation means which generates a diffusion sign, and the timing on the basis of the synchronizing signal of the video signal supplied from said video-signal output unit The diffusion sign reversal means by the side of the record which reverses the phase of said diffusion sign from said 2nd diffusion sign generation means, The reverse spectrum diffusion-process means which takes out said additional information on which said video signal which performs reverse spectrum diffusion and is supplied from said video-signal output unit according to said diffusion sign processed by said 2nd diffusion sign reversal means was overlapped, It is characterized by having the duplicate control means which performs duplicate control of said video signal based on said additional information taken out by said reverse spectrum diffusion-process means.

[0040] According to the system according to claim 17 by this invention, while generation of a diffusion sign is started to the generating initiation timing based on the synchronizing signal of a video signal in a video-signal output unit, phase inversion of the diffusion sign is carried out for every timing based on said synchronizing signal. Here, the phase inversion of a diffusion sign means bit flipping which reverses a sign 0 to 1 and reverses a sign 1 to 0. Spectrum diffusion is used and carried out and

additional information is superimposed on this diffusion sign by which the reversal process was carried out by the video signal.

[0041] In a recording device, while generation of a diffusion sign is started to this synchronizing signal based on the synchronizing signal of the video signal supplied from the video-signal output unit to the same timing as the generating initiation timing in a video-signal output unit, the polarity of the diffusion sign generated in a recording device for every timing based on a synchronizing signal is reversed. In a recording device, this diffusion sign by which the reversal process was carried out is used, and reverse spectrum diffusion is performed.

[0042] It is necessary to control the generating timing of the diffusion sign used for reverse spectrum diffusion to the video signal from a video-signal output unit at the time of reverse spectrum diffusion, and to make it the same as the diffusion sign used for spectrum diffusion in the regenerative apparatus.

[0043] Generating timing is decided based on the image synchronizing signal separated from a video signal. For this reason, generating timing of the diffusion sign which makes it generate in a recording device can be made the same as the generating timing of the diffusion sign used in the regenerative apparatus to an image synchronizing signal.

[0044] Furthermore, phase inversion of the diffusion sign for diffusion used for spectrum diffusion in a regenerative apparatus and the diffusion sign for the back diffusion of electrons used for reverse spectrum diffusion in a recording device is carried out for every timing based on an image synchronizing signal. For example, the diffusion sign from which a polarity differs for every field is generable by making every 1 field (1 perpendicular section) reverse the polarity of a diffusion sign.

[0045] And in a recording device, the additional information on which the diffusion sign for the back diffusion of electrons by which phase inversion was carried out like the diffusion sign for diffusion so that polarities might differ for every field was used for, spectrum diffusion of the reverse spectrum diffusion was performed and carried out, and the video signal was overlapped is detected.

[0046] At the time of this reverse spectrum diffusion, when the diffusion sign from which it was made for a polarity to differ for every field is multiplied and finds the integral to a video signal including the duplicate prevention control signal by which spectrum diffusion was carried out, the duplicate prevention control signal on which the video signal was overlapped is taken out. In this case, the diffusion sign from which it was made for a polarity to differ for every field comes to reverse the polarity of the video-signal component in this regenerative signal for every field by being multiplied

by the regenerative signal.

[0047] A video signal is a high signal of functionality between the adjoining field, inter-frame, and an adjoining horizontal scanning line. Therefore, each other is offset in order to negate mutually the video-signal component of the adjoining field where it was made for polarities to differ by integral processing at the time of reverse spectrum diffusion.

[0048] Without being influenced by this by the video-signal component with big level, the additional information on which spectrum diffusion was carried out and the video signal was overlapped can be detected, and the detection efficiency of additional information can be raised. Therefore, the detection efficiency of the additional information on which the video signal was overlapped can be raised, and diffusion gain can be reduced.

[0049] Moreover, when the polarity of a diffusion sign is reversed as mentioned above for every timing based on the image synchronizing signal in a video signal, the polarity (phase) of the additional information on which a video signal is overlapped is reversed according to the diffusion sign multiplied. In this case, like the polarity reversals for every field of the chrominance subcarrier of a color video signal, and the polarity reversals for every horizontal scanning period, since brightness change is reversed by the adjoining additional information from which a polarity differs, the additional information on which the video signal was overlapped is equalized, and it is made not conspicuous [additional information]. This can be prevented from being conspicuous in visual active jamming of the image by being superimposed on additional information reproduced.

[0050] Moreover, invention of claim 18 is a video-signal transmission system according to claim 17, in said spectrum diffusion-process means, spectrum diffusion is carried out and said video-signal output unit is characterized by having the level adjustment device which adjusts the level of said additional information supplied to said superposition means.

[0051] When the polarity of for example, a diffusion sign is reversed, a video signal is overlapped on additional information by this, and this additional information can lessen effect which it has on a video signal, superposition level of additional information can be enlarged. And if it is when superposition level is enlarged, the detection efficiency of the additional information in a recording device can be raised further.

[0052] Moreover, a record medium according to claim 21 is the generating initiation timing on the basis of the synchronizing signal in a video signal, and is characterized by to record the video signal on which the additional information which carried out

spectrum diffusion using said diffusion sign to which the reversal process which reverses the phase of the diffusion sign by which generating is started to the timing on the basis of the synchronizing signal in said video signal was performed, and said reversal process was performed was made to superimpose.

[0053] In the recording device which receives supply of the video signal reproduced from this record medium according to this record medium according to claim 21 Generating is started to a video signal to the same timing as the diffusion sign used at the time of spectrum diffusion of the additional information on which the video signal currently recorded on the record medium was overlapped. using the diffusion sign by which the polarity was reversed to the same timing -- the above-mentioned -- as -- the detection efficiency of the additional information by reverse spectrum diffusion can be raised.

[0054] Moreover, the polarity of a diffusion sign is reversed for every timing based on an image synchronizing signal, and spectrum diffusion of this diffusion sign by which the reversal process was carried out is used and carried out. By this, since brightness change is reversed by the adjoining additional information from which a polarity differs, this brightness change is equalized and it is made not conspicuous [the additional information on which **** was also overlapped at the video signal]. It can avoid being conspicuous in visual active jamming of the image reproduced by this by the video signal by which it was superimposed on additional information.

[0055] Therefore, a quality image can be offered even if it is the image record medium with which the video signal with which it was superimposed on the unjust additional information for duplicate prevention by which spectrum diffusion was carried out was recorded.

[0056]

[Embodiment of the Invention] Hereafter, the gestalt of operation of the video-signal transmission approach by this invention, a system, a video-signal output unit, additional information detection equipment, a recording device, and a record medium is explained, referring to drawing. In the gestalt of the operation explained below, a video-signal output unit is the case of a regenerative apparatus. And this regenerative apparatus and recording apparatus are explained [both] as what was applied to the record regenerative apparatus (it is called DVD equipment below) of DVD (digital videodisc). Moreover, in order to simplify explanation, the explanation about a sound signal system is omitted.

[0057] In addition, as mentioned later in detail, the video-signal transmission system explained below is the case of an image duplicate control system, and is the case

where carry out spectrum diffusion of this duplicate prevention control signal, and it superimposes and transmits to a video signal, using a duplicate prevention control signal as additional information. And with the gestalt of this operation, in a regenerative apparatus, spectrum diffusion of the duplicate prevention control signal as an example of additional information is carried out, it superimposes on a video signal, reverse spectrum diffusion is carried out in a recording device, using the sign (PN code) of PN (Pseudorandom Noise) sequence as a diffusion sign, a duplicate prevention control signal is taken out, and duplicate control of a video signal is performed using this.

[0058] [Gestalt of the 1st operation] drawing 1 and drawing 2 are drawings for explaining the picture reproducer (only henceforth a regenerative apparatus) 10 and the image recording device (only henceforth a recording device) 20 which are used with the image duplicate control system as an example of the video-signal transmission system of the gestalt of this 1st operation. That is, a regenerative apparatus 10 is equivalent to the reversion system of DVD equipment, and a recording device 20 is equivalent to the recording system of DVD equipment.

[0059] In drawing 1 , the video signal and sound signal which were digitized were recorded, and the duplicate prevention control signal was recorded as additional information, and a record medium 100 is DVD in this example. A duplicate prevention control signal is also recordable on the truck area called TOC besides the innermost [of a disk], and a directory, on the truck with which image data and voice data are recorded, it can set aside record area and insertion record can also be carried out. The example explained below is an example in the case of the latter, and when image data are read, it is the case where a duplicate prevention control signal is also read to coincidence.

[0060] And in the gestalt of this 1st operation, a duplicate prevention control signal is a signal which shows prohibition or that it grants a permission or restricts [generation], and the duplicate is added into the video signal. A regenerative apparatus 10 is loaded with a record medium 100, and the signal currently recorded is read.

[0061] As shown in drawing 1 , the regenerative apparatus 10 of the gestalt of this 1st operation is equipped with the read-out section 11, the decryption section 12, the duplicate prevention control signal extract section 13, the synchronizing separation section 14, the PN code generation section 15, the PN code pars inflexa 16, the generation section (henceforth SS duplicate prevention control signal generation section) 17 of the duplicate prevention control signal by which spectrum diffusion was

carried out, an adder unit 18, and the D/A conversion circuits 191 and 192.

[0062] The read-out section 11 takes out the playback video-signal component S2 from the signal S1 which reproduces a record medium 100 and is acquired, and supplies this to the decryption section 12 and the duplicate prevention control signal extract section 13.

[0063] The decryption section 12 performs decryption processing about the playback video-signal component S2, forms a digital video signal, and supplies this to the D/A conversion circuit 191. The D/A conversion circuit 191 carries out D/A conversion of the digital video signal, forms analog video-signal S2A which has a synchronizing signal, and supplies this to the synchronizing separation section 14 and an adder unit 18.

[0064] The duplicate prevention control signal extract section 13 extracts the duplicate prevention control signal S3 added to the playback video-signal component S2, and supplies the extracted duplicate prevention control signal S3 to SS duplicate prevention control signal generation section 17.

[0065] On the other hand, from analog video-signal S2A, the synchronizing separation section 14 extracts image synchronizing signal S4, and supplies this to the PN code generation section 15. In the gestalt of this 1st operation, a Vertical Synchronizing signal is taken out as image synchronizing signal S4, and the PN code generation section 15 is supplied.

[0066] The PN code generation section 15 forms various kinds of timing signals used in other processing sections while generating the PN code as a diffusion sign on the basis of Vertical Synchronizing signal S4.

[0067] Drawing 3 is a block diagram for explaining the PN code generation section 15 of the gestalt of this 1st operation. As shown in drawing 3 , the PN code generation section 15 is equipped with the PN code initiation timing signal generation section 151, the PLL circuit 152, the PN code generator 153, and the timing signal generation section 154. And Vertical Synchronizing signal S4 taken out in the synchronizing separation section 14 is supplied to the PN code generating timing section 151 of the PN code generation section 15, the PLL circuit 152, and the timing signal generation section 154.

[0068] The PN code initiation timing signal generation section 151 generates the PN code initiation timing signal T1 (drawing 4 B) which shows the timing which makes generating of a PN code start on the basis of Vertical Synchronizing signal S4 (drawing 4 A), and supplies this to the PN code generator 153. It is made for the PN code initiation timing signal T1 to make every 1 perpendicular section (for it to be

indicated as 1V by a diagram) start generating of a PN code on the basis of Vertical Synchronizing signal S4 in the gestalt of this 1st operation.

[0069] Moreover, he is trying to be used also as a timing signal [in / in the PN code initiation timing signal T1 generated in the PN code initiation timing section 151 / other processing sections].

[0070] The PLL circuit 152 generates a clock signal CLK on the basis of Vertical Synchronizing signal S4 supplied to this, and supplies this to the PN code generator 153. In the gestalt of this 1st operation, a frequency generates the clock signal CLK which is 250kHz so that the PLL circuit 152 may also carry out the after-mentioned.

[0071] The PN code generator 153 generates PN code S5 according to a clock signal CLK, and outputs this while it determines the timing of generating initiation of a PN code with the PN code initiation timing signal T1.

[0072] Drawing 5 is drawing showing an example of the PN code generator 153 shown in drawing 3 . The PN code generator 153 of this example consists of 12 D flip-flops REG1-REG12 which constitute 12 steps of shift registers, and IKUSUKURUSHIBUOA circuit EX-OR1 which calculates the proper tap output of this shift register - EX-OR3, and enables it to make per 1 perpendicular section PN code S5 of 4095 chips generated in response to supply of the PN code initiation timing signal T1 as a reset signal, clock signal CLK, and an enable signal EN.

[0073] In this case, if a clock rate is set to about 250kHz, one period of a PN code is set to 4095 / 250= 16.38ms, and can store the PN code of 4095 chips in the about 1 perpendicular section (16.7ms). And the clock phase of a PN code can be arranged for every 1 perpendicular section by using the PN code initiation timing signal T1 as a reset signal.

[0074] The timing signal generation section 154 generates various kinds of timing signals based on Vertical Synchronizing signal S4. In the gestalt of this 1st operation, the timing signal generation section 154 generates reversal timing signal HT (drawing 4 C) used in the PN code pars inflexa 16 mentioned later, and supplies this to the PN code pars inflexa 16.

[0075] In the gestalt of this 1st operation, reversal timing signal HT is generated as a signal reversed for every perpendicular section, as shown in drawing 4 C.

[0076] Thus, the PN code generation section 15 generates PN code S5 based on the PN code initiation timing signal T1 and a clock signal CLK while generating the PN code initiation timing signal T1, clock signal CLK, and reversal timing signal HT by making Vertical Synchronizing signal S4 into a reference signal. PN code S5 generated here, clock signal CLK, and reversal timing signal HT are supplied to the PN code pars

inflexa 16.

[0077] The PN code pars inflexa 16 controls whether the polarity of PN code S5 from the PN code generation section 15 is reversed (a sign 0 is reversed to 1 and a sign 1 is reversed to 0) based on reversal timing signal HT, and forms PN reversal sign S6. As mentioned above, reversal timing signal HT is a signal reversed for every perpendicular section, and the PN code pars inflexa 16 reverses the polarity of PN code S5 in the perpendicular section when for example, reversal timing signal HT becomes high-level. PN reversal sign S6 is supplied to SS duplicate prevention control signal generation section 17. In addition, reversal timing signal HT may be a phase as shown in drawing 4 D. That is, the polarity of a PN code may be reversed by whichever of the odd number field and the even number field.

[0078] SS duplicate prevention control signal generation section 17 carries out spectrum diffusion of the duplicate prevention control signal S3 using PN reversal sign S6, and a duplicate prevention control signal forms it spectrum diffusion signal S7, and it supplies this to the D/A conversion circuit 192. The D/A conversion circuit 192 changes the spectrum diffusion signal S7 into analog signal S7A, and supplies it to an adder unit 18.

[0079] By adding spectrum diffusion signal S7A made into the analog signal to analog video-signal S2A, an adder unit 18 forms output video-signal S8A, and outputs this. Thus, an adder unit 18 has a function as a superposition means to superimpose spectrum diffusion signal S7A which is the duplicate prevention control signal in which spectrum diffusion was carried out by PN reversal sign S6, to analog video-signal S2A.

[0080] And analog output video-signal S8A superimposed on the duplicate prevention control signal by which spectrum diffusion was carried out is supplied to the monitor receiving set which displays an image, and the recording device 20 which records a video signal on a record medium.

[0081] Next, in response to supply of video-signal S8A from the above-mentioned regenerative apparatus 10, the recording device 20 which records a video signal is explained. The recording device 20 of the gestalt of this 1st operation has the duplicate control section 26 which controls the coding section 21, the synchronizing separation section 22, the PN code generation section 23, the PN code pars inflexa 24, the detecting element (henceforth SS duplicate prevention control signal detecting element) 25 that detects the duplicate prevention control signal on which spectrum diffusion was carried out and the video signal was overlapped, authorization of a duplicate, prohibition, etc., the write-in section 27, and the A/D-conversion circuit 291, as shown in drawing 2 . Moreover, a record medium 200 is DVD in which a video

signal is written by the recording device 20.

[0082] Video-signal S8A supplied from the regenerative apparatus 10 is changed into the digital video signal S8 by the A/D-conversion circuit 291, and is supplied to the coding section 21, the synchronizing separation section 22, and SS duplicate prevention control signal detecting element 25.

[0083] In response to supply of the digital video signal S8, an image synchronizing signal is removed, or the coding section 21 performs coding processing of carrying out the data compression of the digital video signal, forms digital video-signal S9 for record supplied to a record medium 200, and supplies it to the write-in section 27.

[0084] From the digital video signal S8 before coding processing is carried out, the synchronizing separation section 22 extracts the image synchronizing signal S11, and supplies this to the PN code generation section 23. In the recording device 20 of the gestalt of this 1st operation, a Vertical Synchronizing signal is used as an image synchronizing signal S11 corresponding to the above-mentioned regenerative apparatus 10.

[0085] The PN code generation section 23 is constituted like the PN code generation section 15 of the regenerative apparatus 10 mentioned above using drawing 3 , and is equal to the PN code initiation timing signal generation section 151, the PLL circuit 152, the PN code generator 153 shown in drawing 5 , and the thing equipped with the timing signal generation section 154. So, the PN code generation section 23 explains here as what has the configuration of drawing 3 .

[0086] In the PN code generation section 23, the PN code initiation timing signal T1 which makes generating of a PN code start for every 1 perpendicular section by the PN code initiation timing signal generation section 151 is generated like the PN code generating section 15 of the above-mentioned regenerative apparatus 10, and the clock signal CLK whose frequency is 250kHz is generated by the PLL circuit 152. The PN code initiation timing signal T1 and a clock signal CLK are supplied to the PN code generator 153.

[0087] The PN code generator 153 generates PN code S5 (S12 of drawing 2) using the PN code initiation timing signal T1 and a clock signal CLK. Namely, PN code S12 is generated to a video signal S8 at the same generating initiation timing as PN code S5 which made it generate in a regenerative apparatus 10, and the same generating rate.

[0088] Moreover, reversal timing signal HT used by the timing signal generation section 154 of the PN code generation section 23 in the PN code pars inflexa 24 is generated. This reversal timing signal HT is a signal reversed for every 1 perpendicular section, as mentioned above.

[0089] PN code S12 and reversal timing signal HT which were generated in the PN code generation section 23 are supplied to the PN code pars inflexa 24.

[0090] The PN code pars inflexa 24 reverses the polarity of PN code S12 supplied to reversal timing signal HT from **** and the PN code generation section 23 every 1 perpendicular section like the PN code pars inflexa 16 of the regenerative apparatus 10 mentioned above, and forms PN reversal sign S13. PN reversal sign S13 is supplied to SS duplicate prevention control signal detecting element 25.

[0091] SS duplicate prevention control signal detecting element 25 has the function as a reverse spectrum diffusion-process means, takes out the duplicate prevention control signal on which spectrum diffusion is carried out and PN reversal sign S13 is superimposed by the video signal S8 by performing reverse spectrum diffusion process as a reference signal, and supplies it to the duplicate control section 26 as a duplicate prevention control signal S14.

[0092] That is, in SS duplicate prevention control signal detecting element 25, PN reversal sign S13 generated to the same initiation timing as PN reversal sign S6 used in the regenerative apparatus 10 at the time of spectrum diffusion, the same generating rate, and the same reversal timing is used to a video signal S8, and reverse spectrum diffusion is performed.

[0093] As opposed to the video signal S8 which includes the duplicate prevention control signal by which spectrum diffusion was carried out also in the above-mentioned at the time of this reverse spectrum diffusion Although the duplicate prevention control signal as additional information is detected by whether PN reversal sign S13 multiplied and the correlation value of the multiplication result exceeded the predetermined SURESSHORUDO value When it is not able to detect in 1 field (1 perpendicular section), the duplicate prevention control signal on which the video signal S8 was overlapped is taken out by crossing a multiplication result to two or more fields, and being integrated. In the gestalt of this operation, the polarity of a video signal S8 is reversed for every 1 perpendicular section by multiplying PN reversal sign S13 by which the polarity was reversed for every 1 perpendicular section by the video signal S8.

[0094] A video signal is a high signal of functionality between the fields which also adjoin the above-mentioned. Therefore, each other is offset in order to negate mutually the video-signal component of the adjoining field where it was made for polarities to differ by integral processing at the time of reverse spectrum diffusion. The duplicate prevention control signal on which the duplicate prevention control signal with which spectrum diffusion was carried out and level was made low by this

was superimposed by the video signal correctly and quickly by negating a video signal with big level can be extracted. Thus, the duplicate prevention control signal S14 taken out by SS duplicate prevention control signal detecting element 25 is supplied to the duplicate control section 26.

[0095] The duplicate control section 26 decodes the duplicate prevention control signal S14, and distinguishes the ban on a duplicate, and duplicate authorization. And authorization of the writing of video-signal S9 and control of prohibition are performed by generating the write-in control signal S15, writing this in based on the distinction result, and supplying the section 27.

[0096] The write-in section 27 performs the writing to the record medium 200 of video-signal S9, when the write-in control signal S15 is what permits writing, and in being what the write-in control signal S15 forbids writing, it makes it not write video-signal S9 in a record medium 200.

[0097] Thus, generating of a PN code can be made to start to the same timing to a Vertical Synchronizing signal in a regenerative apparatus 10 and a recording device 20 based on a Vertical Synchronizing signal by making generating of a PN code start for every 1 perpendicular section. That is, the synchronization with the PN code used for spectrum diffusion on the basis of the image synchronizing signal and the PN code used for the back diffusion of electrons is establishable.

[0098] Furthermore, in the both sides of a regenerative apparatus 10 and a recording device 20, by using PN reversal sign which serves as the same timing to a video signal and which reversed the polarity of a PN code for every 1 perpendicular section, as mentioned above, at the time of the reverse spectrum diffusion in a recording device 20, the duplicate prevention control signal on which spectrum diffusion of the video-signal component was negated and carried out, and the video signal was overlapped can be taken out quickly and correctly. For this reason, the detection efficiency of the duplicate prevention control signal S14 on which spectrum diffusion was carried out and the video signal S8 was overlapped can improve, and diffusion gain can be made small.

[0099] Moreover, the polarity of the duplicate prevention control signal with which spectrum diffusion of this PN reversal sign is multiplied and carried out is also reversed for every 1 perpendicular section by using PN reversal sign which reversed the polarity of the PN code of every 1 perpendicular section. Therefore, brightness change of the duplicate prevention control signal on which it was superimposed is reversed for every field.

[0100] Also when the video signal with which the brightness change was equalized and

the duplicate prevention control signals from which the polarity on which the adjoining field was overlapped by this differs were superimposed on the duplicate prevention control signal is reproduced, a duplicate prevention control signal component ceases to be conspicuous.

[0101] Moreover, although every 1 perpendicular section (1 field) is made to start generating of a PN code based on a Vertical Synchronizing signal, you may make it generate the PN code initiation timing signal T1 in the gestalt of this 1st operation as a signal which makes every 2 perpendicular sections (one frame) start generating of a PN code. Moreover, you may make it generate also about reversal timing signal HT as what reverses the polarity of a PN code for every 2 perpendicular sections.

[0102] That is, in the PN code initiation timing signal generation section 151 of the PN code generation section 15 of the regenerative apparatus 10 mentioned above, the PN code initiation timing signal T2 of 2 perpendicular periods is generated, and reversal timing signal HT2 reversed for every 2 perpendicular periods in the timing signal generation section 154 is generated.

[0103] Also in a recording device 20, in the PN code generation section 15 of a regenerative apparatus 10, and the PN code generation section 23 formed similarly, the PN code initiation timing signal T2 of 2 perpendicular periods is generated, and reversal timing signal HT2 of 2 perpendicular periods is generated.

[0104] Drawing 6 shows the example of the PN code initiation timing signal T2 in this case, and reversal timing signal HT2. Either drawing 6 B or drawing 6 D is OK as the PN code initiation timing signal T2 of 2 perpendicular periods generated on the basis of the first transition of a Vertical Synchronizing signal (drawing 6 A). In the case of the PN code initiation timing signal T2 of drawing 6 B, reversal timing signal HT2 comes to be shown at drawing 6 C, and, in the case of the PN code initiation timing signal T2 of drawing 6 D, shows reversal timing signal HT2 at drawing 6 E. In addition, it is also possible to generate drawing 6 C or reversal timing signal HT2 of drawing 6 E, and the signal of opposition as reversal timing signal HT2 of 2 perpendicular periods, respectively, and to use them.

[0105] And spectrum diffusion of a duplicate prevention control signal, superposition to the video signal of the duplicate prevention control signal which carried out spectrum diffusion, and reverse spectrum diffusion can be performed by making one frame into a batch by using the PN code initiation timing signal T2 and reversal timing signal HT2 of 2 perpendicular periods shown in drawing 6 B and drawing 6 D.

[0106] In this case, at the time of the reverse spectrum diffusion in SS duplicate prevention control signal extract section 25 of a recording device 20, to the video

signal S8 including the duplicate prevention control signal by which spectrum diffusion was carried out, generating is started for every 2 perpendicular sections, and PN reversal sign S13 by which the polarity was reversed for every 2 perpendicular sections is multiplied. Thereby, the polarity of a video signal S8 is also reversed for every 2 perpendicular sections.

[0107] A video signal is a high signal of functionality also in inter-frame [which also adjoins the above-mentioned]. Therefore, also when the reversal timing HT 2 of the PN code initiation timing signal T2 of 1 frame period and 1 frame period is used, at the time of reverse spectrum diffusion, the video-signal component of the adjoining frame from which it was made for a polarity to differ is negated. Thereby, the duplicate prevention control signal on which spectrum diffusion is carried out and the video signal S8 is overlapped can be taken out correctly and quickly in a recording device 20, without being influenced by the video-signal component.

[0108] Moreover, the polarity of the duplicate prevention control signal with which spectrum diffusion of this PN reversal sign is multiplied and carried out is also reversed for every 2 perpendicular sections by using PN reversal sign which reversed the polarity for every 2 perpendicular sections. Therefore, brightness change of the duplicate prevention control signal on which the polarities of the adjoining duplicate prevention control signal on which it is superimposed for every frame differed, and were made, and it was superimposed is reversed in every 2 perpendicular sections (one frame).

[0109] The brightness change is equalized, and also when the video signal with which it was superimposed on the duplicate prevention control signal is reproduced, it is made not conspicuous [the duplicate prevention control signals from which the polarity on which the adjoining frame was overlapped by this differs].

[0110] Thus, also when the PN code initiation timing signal of a 2 perpendicular sections (one frame) period and the reversal timing signal reversed for every 2 perpendicular sections are used, the same effectiveness as the case where the PN code initiation timing signal of 1 field period and the reversal timing signal reversed for every 1 perpendicular section are used can be acquired.

[0111] In addition, when using the timing signals T2 and HT2 of drawing 6 D and E, a video-signal component is negated by field correlation, and it is made not noticeable [brightness change of the duplicate prevention control signal in a playback image].

[0112] Although the Vertical Synchronizing signal was used as image synchronizing signal S4 and S11, you may make it use a Horizontal Synchronizing signal in the gestalt of the 1st operation of the [modification of gestalt of the 1st operation]

above-mentioned.

[0113] Namely, in this case, in the regenerative apparatus 10 shown in drawing 1 , by the synchronizing separator circuit 14, a Horizontal Synchronizing signal is taken out from a video signal, and the PN code generation section 15 is supplied by making this into image synchronizing signal S4.

[0114] The PN code generation section 15 is considered as the configuration shown in drawing 3 , as mentioned above. And the PN code initiation timing signal generation section 151 smell of the PN code generation section 15 generates PN code initiation timing signal T3 which makes every 1 level section (henceforth 1H) start generating of a PN code in this case based on Horizontal Synchronizing signal S4.

[0115] Drawing 7 is drawing for explaining the example of PN code initiation timing signal T3 generated in the PN code initiation timing signal generation section 151, and reversal timing signal HT3 in that case. drawing 7 B -- criteria [first transition / of a Horizontal Synchronizing signal (drawing 7 A)] -- carrying out -- 1 -- it is the example of PN code initiation timing signal T3 which makes generating of a PN code start for every H. Drawing 7 C is the example of reversal timing signal HT3 in that case, and is a signal reversed to every 1H. In this case, the signal which shows reversal timing signal HT3 to drawing 7 may be a signal of opposition.

[0116] In the case of this example, in the PLL circuit 152, a clock signal CLK is generated by making a Horizontal Synchronizing signal into a reference signal. The clock signal CLK generated here is supplied to the PN code generator 153. In this example, the PLL circuit 152 generates the clock signal CLK whose frequency is 1MHz.

[0117] Drawing 8 is drawing showing an example of the PN code generator 153 which is used in the case of this example, and becomes six D flip-flops REG1-REG6 from IKUSUKURUSHIBUOA circuit EX-OR. The PN code generator shown in this drawing 8 enables it to make 1H hit generate the PN code of 63 chips in response to supply of PN code initiation timing signal T3 as a reset signal, clock signal CLK, and an enable signal EN.

[0118] In this case, since a clock rate is 1MHz, one period of a PN code can be set to 63 / 1= 63 microseconds, and can generate the PN code of 63 chips at an about 1 horizontal scanning period (63.5 microseconds). And as a reset signal, for example, PN code initiation timing signal T3 is used, and the phase of a PN code can be arranged with every 1H.

[0119] Moreover, in the timing signal generation section 154, various kinds of timing signals of reversal timing signal HT which made the Horizontal Synchronizing signal

the reference signal, and others are generated. In this example, the timing signal generation section 154 generates reversal timing signal HT3 which makes every 1H reverse the polarity of a PN code like PN code initiation timing signal T3.

[0120] therefore, the regenerative apparatus 10 -- setting -- criteria [Horizontal Synchronizing signal] -- carrying out -- 1 -- generating begins for every H -- having -- 1 -- using PN reversal sign S6 by which the polarity was reversed for every H, spectrum diffusion of the duplicate prevention control signal S3 is carried out, and it superimposes on a video signal.

[0121] It is made similarly to supply the PN code generation section 22 from a video signal by the synchronizing separation section 22 in the recording device 20 shown in drawing 2 by making into the image synchronizing signal S11 the Horizontal Synchronizing signal which taken out and took out the Horizontal Synchronizing signal.

[0122] It is formed like [the PN code generation section 22 of this recording device 20] the PN code generation section 15 of a regenerative apparatus 10, and PN code initiation timing signal T3 which makes every 1H start generating of PN code S12, and a frequency generate reversal timing signal HT3 which makes every 1H reverse the phase of PN code S12 like clock signal CLK and PN code generating timing signal T3 which are 1MHz.

[0123] Therefore, in a recording device 20, generating is started by every 1H on the basis of Horizontal Synchronizing signal S11, reverse spectrum diffusion is performed using PN reversal sign S13 with which the polarity was reversed by every 1H, and the duplicate prevention control signal on which spectrum diffusion is carried out and the video signal is overlapped is taken out.

[0124] and it mentioned above -- as -- a regenerative apparatus 10 -- setting -- 1 -- generating of PN code S5 begins for every H -- having -- 1 -- the case where the polarity of PN code S5 is reversed for every H -- a recording device 20 -- also setting -- 1 -- generating of PN code S12 begins for every H -- having -- 1 -- the polarity of PN code S12 is reversed for every H. therefore, the initiation timing (clock phase) of PN reversal signs S6 and S13 generated with a regenerative apparatus 10 and a recording device 20 to a video signal -- 1 -- it doubles for every H.

[0125] And although it resembles that PN reversal sign S13 is multiplied to the video signal S8 from a regenerative apparatus 10 and reverse spectrum diffusion is performed more at the time of the reverse spectrum diffusion in a recording device 20 the time of this reverse spectrum diffusion -- the above-mentioned -- as -- when PN reversal sign S13 is multiplied and finds the integral to the video signal S8 including the duplicate prevention control signal by which spectrum diffusion was carried out,

the duplicate prevention control signal on which the video signal was overlapped is extracted.

[0126] The polarity of a video signal S8 is also reversed by every 1H by multiplying this PN reversal sign S13 by the video signal S8. A video signal is a signal with functionality high also about the signal of the adjoining level section. And in the integral processing at the time of reverse spectrum diffusion, each other is offset in order to negate mutually the video-signal component of the adjoining level section which a polarity reverses, and the duplicate prevention control signal on which the things video signal influenced of a video-signal component was overlapped can be extracted.

[0127] Thus, without being influenced by the video-signal component since a video-signal component can be negated at the time of reverse spectrum diffusion also when the PN code initiation timing signal T1 and reversal timing signal HT are generated based on a Horizontal Synchronizing signal, spectrum diffusion is carried out and the duplicate prevention control signal on which the video signal was overlapped can be taken out correctly and quickly.

[0128] Moreover, as for PN reversal sign S13, the polarity of a sign is reversed by every 1H as mentioned above. The phase of a duplicate prevention control signal is also reversed by every 1H by multiplying this PN reversal sign. Therefore, it is equalized when brightness change of the duplicate prevention control signal on which a video signal is overlapped in the adjoining level section is reversed. An image does not deteriorate without the duplicate prevention control signal on which it was superimposed being conspicuous also when the video signal with which it was superimposed on the duplicate prevention control signal is reproduced by this.

[0129] Moreover, in this example, although PN code initiation timing signal T3 was generated as a signal which makes 1H one period, it may be made to make one period the 2 level sections (henceforth 2H).

[0130] In drawing 7 , both drawing 7 D and drawing 7 E shows the example of PN code initiation timing signal T3 which makes every 2H start generating of a PN code. In this case, you may make it the signal of opposition shown in drawing 7 E and drawing 7 G used for corresponding reversal timing signal HT3 as reversal timing signal HT3, respectively.

[0131] Thus, since it can avoid being conspicuous in the visual active jamming at the time of the image reproduction by being able to raise the detection efficiency of the duplicate prevention control signal on which spectrum diffusion was carried out and the video signal was overlapped, and superimposing a duplicate prevention control

signal on a video signal when based on a Horizontal Synchronizing signal, diffusion gain can be reduced. Therefore, also when a Horizontal Synchronizing signal is used as a reference signal, the same effectiveness as the case where a Vertical Synchronizing signal is used as a reference signal can be acquired.

[0132] The duplicate control system as an example of the video-signal transmission system of [the gestalt of the 2nd operation], next the gestalt of the 2nd operation and the regenerative apparatus of a video signal are explained.

[0133] Drawing 9 is a block diagram for explaining the regenerative apparatus used by the system of the gestalt of the 2nd operation. In addition, in the system of the gestalt of this 2nd operation, the recording device 20 of the gestalt of the 1st operation which mentioned the recording device above is used.

[0134] As shown in drawing 9 , the regenerative apparatus 30 of the gestalt of this 2nd operation is equipped with the read-out section 11, the decryption section 12, the duplicate prevention control signal extract section 13, the synchronizing separation section 14, the PN code generation section 15, the PN code pars inflexa 16, SS duplicate prevention control signal generation section 17, an adder unit 18, and the D/A conversion circuits 191 and 192 like the regenerative apparatus 10 of the gestalt of the 1st operation. And in the regenerative apparatus 30 of the gestalt of this 2nd operation, the level control section 19 is formed between SS duplicate prevention control signal generation section 17 and an adder unit 18. He is trying for each processing section other than level control section 19 to operate like the regenerative apparatus 10 mentioned above. therefore, in the regenerative apparatus 30 of the gestalt of this 2nd operation, when a Vertical Synchronizing signal is used as image synchronizing signal S4 Like the regenerative apparatus 10 mentioned above, while generating PN code S5 for every 1 perpendicular section PN reversal sign S6 which reversed the polarity of PN code S5 for every 1 perpendicular section is formed, and spectrum diffusion of the duplicate prevention control signal S3 extracted by the duplicate prevention control signal extract section 13 using this is performed.

[0135] By carrying out D/A conversion of this spectrum diffusion signal S7, and supplying video-signal S8A which superimposed on analog video-signal S2A, and was generated to a recording device 20, the polarity of a video-signal component will be reversed for every 1 perpendicular section at the time of the reverse spectrum diffusion in a recording device 20, and a video-signal component is negated by the functionality between the fields of a video signal.

[0136] Thereby, as mentioned above in the recording device 20, the detection efficiency of the duplicate prevention control signal on which the video signal was

overlapped can be raised, and it becomes possible to reduce diffusion gain. Moreover, the duplicate prevention control signal on which a video signal is overlapped does not degrade a video signal.

[0137] And the duplicate prevention control signal on which a video signal is overlapped in this way can enlarge superposition level of the duplicate prevention control signal by which spectrum diffusion was carried out within limits which do not degrade a video signal, when it is rare to degrade a video signal.

[0138] Then, the level control section 19 is formed and it enables it to enlarge the regenerative apparatus 30 of the gestalt of this 2nd operation in the superposition level of spectrum diffusion signal S7A superimposed on analog video-signal S2A, as shown in drawing 9 .

[0139] And in the level control section 19 of a regenerative apparatus 30, when analog video-signal S2A is overlapped on spectrum diffusion signal S7A by which level was enlarged, the detection efficiency of the duplicate prevention control signal in a recording device 20 can be raised further.

[0140] You may make it make generating of a PN code start for every 2 perpendicular sections also in the gestalt of this 2nd operation, and the polarity of a PN code may be reversed for every 2 perpendicular sections.

[0141] Moreover, although explained also in the gestalt of this 2nd operation as a thing using a Vertical Synchronizing signal as image synchronizing signal S4, you may make it use a Horizontal Synchronizing signal, of course.

[0142] In the 1st of the [other modification] above-mentioned, and the gestalt of the 2nd operation, the duplicate prevention control signal added to the video signal of a record medium 100 is extracted, spectrum diffusion of this is carried out using PN reversal sign S6, and although it was made to superimpose on the video signal supplied to a recording device, the record medium with which it was beforehand superimposed on the duplicate prevention control signal by which spectrum diffusion was carried out can also be used.

[0143] Thus, what is necessary is for it not to be necessary to take out a duplicate prevention control signal, to carry out spectrum diffusion, and to superimpose the duplicate prevention control signal by which spectrum diffusion was carried out on a video signal like the regenerative apparatus 10 and 30 mentioned above, to reproduce as it is, and just to output, when the duplicate prevention control signal by which spectrum diffusion was carried out beforehand is the record medium on which it was superimposed beforehand.

[0144] And generating is made to start at the same generating rate to the video signal

currently recorded on the record medium in the recording device 20 in this case for every same timing as PN reversal sign used for spectrum diffusion of the duplicate prevention control signal on which spectrum diffusion is carried out and it is superimposed beforehand, and it is made to perform reverse spectrum diffusion using PN reversal sign which reversed the polarity for every same timing.

[0145] Thus, also when the record medium with which it was beforehand superimposed on the duplicate prevention control signal by which spectrum diffusion was carried out beforehand is used, the duplicate prevention control signal on which spectrum diffusion was carried out and the video signal was overlapped can be taken out, and duplicate control according to a duplicate prevention control signal can be performed.

[0146] Moreover, the generating section of a duplicate prevention control signal is prepared in a regenerative apparatus, and spectrum diffusion is carried out using PN reversal sign, and you may make it superimpose on the video signal to output, as the duplicate prevention control signal generated in the regenerative apparatus was mentioned above.

[0147] In this case, also when not superimposed on the duplicate prevention control signal with which the duplicate prevention control signal is not recorded on a record medium from the first and by which a case or spectrum diffusion was carried out, it generates in a regenerative apparatus and duplicate control can be performed in a recording device using the duplicate prevention control signal on which the video signal to output is overlapped.

[0148] In addition, in the above-mentioned 1st and the gestalt of the 2nd operation, although PN code generating initiation timing and the polar reversal timing of a PN code were explained as every 1 perpendicular section and every 2 perpendicular sections, they are not restricted to this. For example, it can make to make every every 2 perpendicular sections / 1 / 4 perpendicular sections into the timing for an integer of the 1 perpendicular section in every one, or to make every 3 perpendicular sections and every 4 perpendicular sections into the timing for every integral multiple of the 1 perpendicular section etc. into various timing on the basis of a Vertical Synchronizing signal.

[0149] moreover, similarly [when the Horizontal Synchronizing signal which is the period of 1/N of a Vertical Synchronizing signal is used as an image synchronizing signal] Initiation timing of generating of a PN code and polar reversal timing of a PN code may be carried out every two or more times of 1 level sections, such as every 1 level section, every 2 level sections, and every 3 level sections, or it may be made to

carry out to every [for an integer] one of the 1 level section like 1 / 2 level sections, and 1 / 3 level sections.

[0150] Moreover, the chip period of a diffusion sign may be a period of 1 pixel, or may be periods of two or more pixels. For example, as one chip of a diffusion sign is assigned to the block unit which is a unit which carries out compression processing of the digital video signal and which consists of vertical x horizontal =8 pixel (Rhine) x8 pixel, it may be made to carry out spectrum diffusion.

[0151] Furthermore, you may make it insert intermittently the additional information of 1 perpendicular section unit by which spectrum diffusion was carried out, or two or more perpendicular section unit every 1 perpendicular section and every two or more perpendicular section. Moreover, you may make it insert by turns two or more information, such as information, generation-control information, etc. which show authorization and prohibition of a duplicate, for every 1 perpendicular section and every two or more perpendicular section. Of course, also when a Horizontal Synchronizing signal is used, it is also possible to insert two or more information [**** / inserting intermittently every 1 level section and every two or more level section similarly] by turns for every 1 level section and every two or more level section.

[0152] It is 2 unit sections when the perpendicular section whose additional information is the unit section, and the level section adjoin unlike the case of reversal, when additional information is superimposed intermittently as mentioned above, even if it detects by carrying out phase inversion of the diffusion sign, since there is information only in one unit section, a disregard level does not necessarily double, but since the video-signal component of each other is negated by the functionality for every unit section, detection of additional information becomes easy.

[0153] Moreover, the phase relation of the generating initiation timing of an image synchronizing signal and a PN code and the timing of polar reversal may be shifted to arbitration. For example, although the PN code initiation timing signal T1 and reversal timing signal HT were generated on the basis of the first transition of a Vertical Synchronizing signal, you may make it generate the PN code initiation timing signal T1 and reversal timing signal HT from the first transition of an image synchronizing signal in the gestalt of the 1st operation of the above-mentioned on the basis of the place shifted by the predetermined clock.

[0154] Moreover, although it is easy making it the same of course also with the phase relation between a PN code initiation timing signal and the reversal timing signal of a PN code, it is good even if it is independent to make it opposition, or to make the PN

code generating timing signal T1 into 1 perpendicular period, and to make reversal timing signal HT into 2 perpendicular periods etc.

[0155] Although the section which superimposes neither phase inversion nor additional information by making the unit section of additional information into a unit in the sequence defined beforehand was determined with the gestalt of the above the 1st and the 2nd operation, it may be made to determine the phase inversion section and the section which does not superimpose additional information at random using a random-number sequence. By doing in this way, it becomes a more powerful cure against protection to those who it is going to turn out how it is superimposed on additional information to the video signal, and are going to give an unjust alteration in ******.

[0156] Moreover, with the gestalt of above-mentioned operation, although the regenerative apparatus 10 and the recording device 20 were explained as respectively separate equipment, the record regenerative apparatus having the function of a regenerative apparatus 10 and a recording device 20 of a video signal can also be formed. In this case, the synchronizing separation sections 14 and 22 and the PN code generation sections 15 and 24 can be constituted so that it may be made to serve a double purpose by the reversion system and the recording system. Moreover, the record regenerative apparatus having the function of a regenerative apparatus 30 and a recording device 20 of a video signal can also be formed.

[0157] Moreover, in the above-mentioned 1st and the gestalt of the 2nd operation, although it explained [******] when it was the analog connection to which the video signal of an analog is supplied to a recording device 20 from regenerative apparatus 10 and 30, it is also possible to apply this invention also in digital connection. Namely, although the additional information which carried out spectrum diffusion is changed into an analog signal and it was made to superimpose on an analog video signal with the gestalt of above-mentioned operation, a spectrum diffusion signal can be superimposed on a digital video signal as a digital signal by making level (digital level) of the chip into minute level.

[0158] Moreover, in the above-mentioned 1st and the gestalt of the 2nd operation, although the regenerative apparatus and the recording device were explained [******] when it applied to DVD equipment, they are not restricted to this. For example, it is also possible to apply this invention to VTR, digital VTR or a videodisk and the regenerative apparatus of a video CD, and a recording device. That is, it is possible to apply this invention to all of digital instruments, such as analog devices, such as Analog VTR, and DVD equipment.

[0159] Moreover, you may make it be the following like the gestalt of the 1st and the 2nd operation mentioned above not using PN reversal sign based on an image synchronizing signal which reversed the polarity for every timing.

[0160] For example, the duplicate prevention control signal which carried out spectrum diffusion every other field of a video signal is superimposed. And after multiplying the PN code of the same generating initiation timing as the PN code used in the regenerative apparatus at the time of spectrum diffusion, and the same generating rate to the video signal with which it was superimposed on the duplicate prevention control signal by which spectrum diffusion was carried out at the time of reverse spectrum diffusion of a recording device, subtraction processing carries out between the video signal of the field where it is superimposed on a duplicate prevention control signal, and the video signal of the field where it is not superimposed on the duplicate prevention control signal which adjoins to this.

[0161] Thereby, the video-signal component of the adjoining high field (perpendicular section) of functionality is negated, and can take out efficiently the duplicate prevention control signal on which the video signal was overlapped. Such [, of course] subtraction processing may be performed by inter-frame [adjoining], and may be performed in the adjoining level sections (level Rhine).

[0162] Moreover, in above-mentioned explanation, although it was made to carry out spectrum diffusion of the additional information by the PN code of one sequence, also when detecting a spectrum diffusion signal by superimposing the PN code from which a sequence differs according to each bit, and detecting those PN codes, when additional information is two or more bits, of course, this invention can be applied.

[0163] Moreover, you may make it reverse the bit information on additional information instead of reversing a diffusion sign, when carrying out phase inversion of the spectrum diffusion signal to the superposition side of additional information.

[0164] Moreover, additional information carries out spectrum diffusion and is not overlapped, but it is level minute to extent which does not have effect in a playback image, and this invention can be applied also when it superimposes the signal corresponding to each bit on a video signal.

[0165] Moreover, although the above explanation explained the case where it applied to a record regeneration system, additional information is superimposed on a video signal, and also when transmitting, it can apply with various transmission media, for example, an electric wave, a cable, infrared radiation, etc. Additional information may be a time code showing each field and the frame of not only a duplicate prevention control signal but copyright information, or a video signal etc.

[0166]

[Effect of the Invention] As explained above, while making the N times or 1/N time as many section of the 1 field of a video signal as this into the unit section for additional information according to this invention Since phase inversion of the predetermined thing of the unit section is carried out and it superimposed additional information, with the polarity of the video-signal component which is an interference wave component at the time of an additional information extract, the additional information component of hard flow can be mutually added to coincidence, and the detection precision of additional information goes up as a result. Therefore, even if it reduces additional information superposition level, additional information is certainly detectable, and even if it superimposes additional information, a quality video signal can be offered.

[0167] Moreover, since according to this invention a diffusion sign is generated to the timing based on an image synchronizing signal and spectrum diffusion of the additional information, such as a duplicate prevention control signal, is carried out with this diffusion sign, generating of a diffusion sign can be made to start to the same timing to a video signal in a video-signal output unit and additional information detection equipment. Thereby, reverse spectrum diffusion in additional information detection equipment can be performed quickly.

[0168] Moreover, the polarity of a video signal is also reversed by reversing the polarity of the sign of a diffusion sign to the timing based on an image synchronizing signal according to the polarity reversals of a diffusion sign at the time of reverse spectrum diffusion. Thereby, the adjoining horizontal scanning line by which the polarity was reversed or the field, and the video-signal component of a frame are negated at the time of reverse spectrum diffusion, and can detect efficiently the additional information on which the video signal was overlapped.

[0169] Thus, the detection efficiency of the additional information on which spectrum diffusion was carried out and the video signal was overlapped can be raised. Moreover, since the detection efficiency of additional information can be raised, it becomes possible to make diffusion gain small.

[0170] Moreover, the polarity of the additional information by which spectrum diffusion of this diffusion sign is multiplied and carried out is also reversed for every timing based on an image synchronizing signal by using the diffusion sign based on an image synchronizing signal which reversed the polarity for every timing. For this reason, in order to make it the polarities of the duplicate prevention control signal on which it was superimposed at the adjoining level section or the adjoining perpendicular section differ, a video signal is not degraded, also when brightness change of additional

information is equalized and a video signal is overlapped on additional information.

[0171] Moreover, since it is rare for the additional information on which a video signal is overlapped to degrade a video signal, superposition level of the additional information by which spectrum diffusion was carried out can be enlarged. And when superposition level is enlarged, the detection efficiency of the additional information in a recording device can be raised further.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is a block diagram for explaining the gestalt of 1 operation of the video-signal output unit of the video-signal transmission system by this invention.

[Drawing 2] It is a block diagram for explaining the gestalt of operation of the recording apparatus as an example of a video-signal processor equipped with the additional information detecting element of the video-signal transmission system by this invention.

[Drawing 3] It is a block diagram for explaining the example of a configuration of the PN code generation section shown in drawing 1 and drawing 2 .

[Drawing 4] It is drawing for explaining the example of the PN code initiation timing signal formed in the picture reproducer and the image recording device which were shown in drawing 1 and drawing 2 , and a reversal timing signal.

[Drawing 5] It is drawing for explaining the example of a PN code generator.

[Drawing 6] It is drawing for explaining other examples of the PN code initiation timing

signal formed in each equipment shown in drawing 1 and drawing 2 , and a reversal timing signal.

[Drawing 7] It is drawing for explaining other examples of the PN code initiation timing signal formed in each equipment shown in drawing 1 and drawing 2 , and a reversal timing signal.

[Drawing 8] It is drawing for explaining the example of a PN code generator.

[Drawing 9] It is a block diagram for explaining the gestalt of other operations of the video-signal output unit of the video-signal transmission system by this invention.

[Description of Notations]

10 [-- Duplicate prevention control signal extract section,] -- A video-signal regenerative apparatus, 11 -- The read-out section, 12 -- The decryption section, 13 14 -- The synchronizing separation section, 15 -- The PN code generation section, 16 -- PN code pars inflexa, 17 -- SS duplicate prevention control signal generation section, 18 -- An adder unit, 19 -- Level control section, 20 -- A video-signal recording device, 21, the coding section, 22 -- The synchronizing separation section, 23 -- PN code generation section, 24 -- The PN code pars inflexa, 25 -- SS duplicate prevention control signal detecting element, 26 -- Duplicate control circuit, 27 [-- A PN code generator, 154 / -- 191 The timing signal generation section, 192 / -- A D/A conversion circuit, 291 / -- An A/D-conversion circuit, 100 / -- A playback side record medium, 200 / -- Record side record medium] -- The write-in section, 151 -- The PN code initiation timing signal generation section, 152 -- A PLL circuit, 153